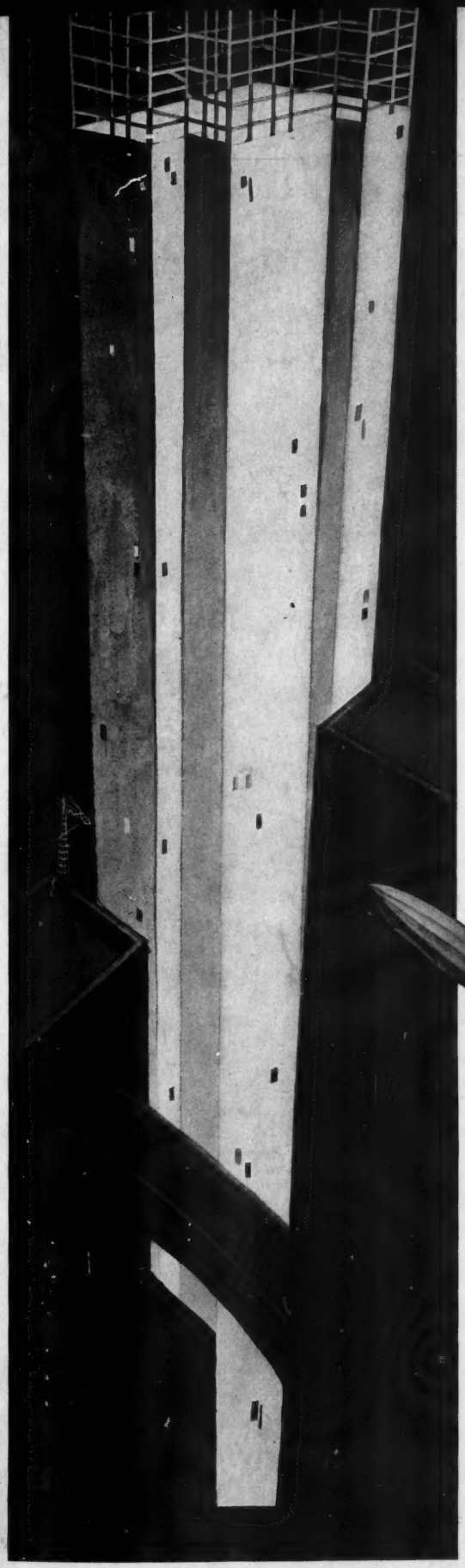

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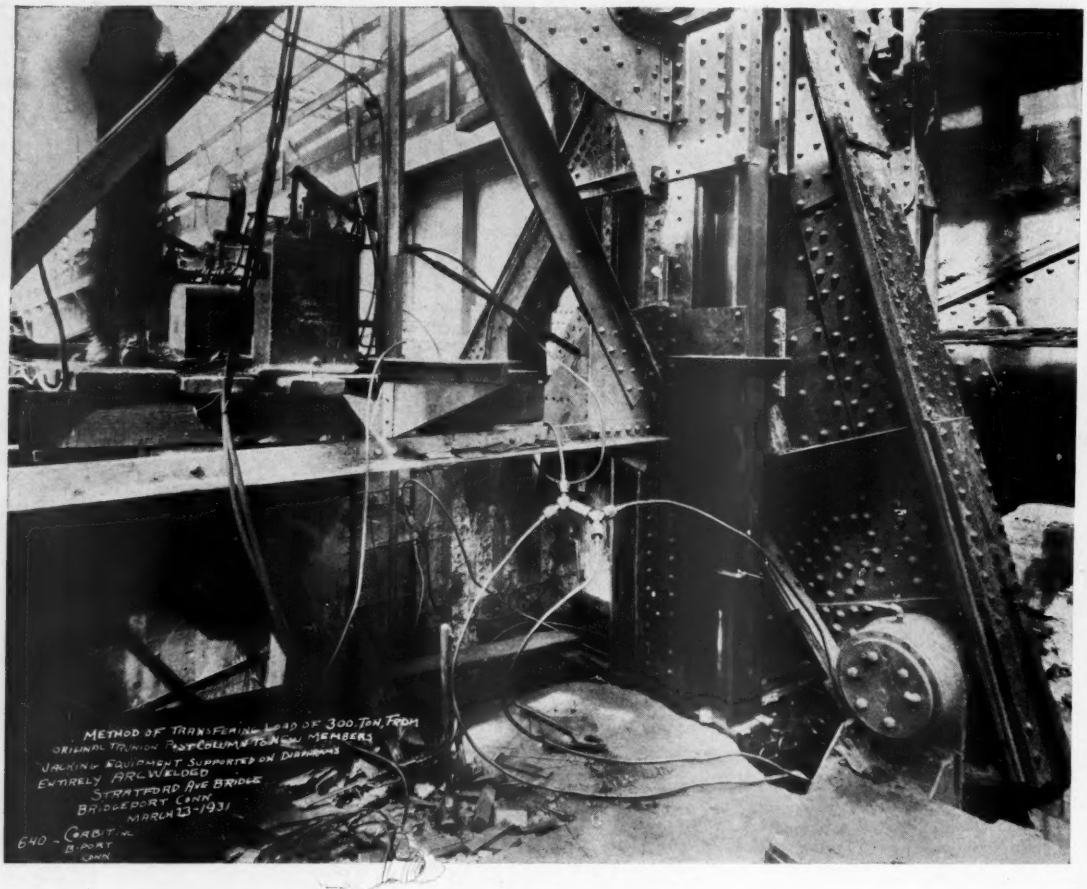
OFFICIAL PUBLICATION
THE NEW YORK STATE SOCIETY
OF PROFESSIONAL ENGINEERS

OCTOBER + + + 1931



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Arthur V. Sheridan, Editor

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LEGISLATION FOR 1932

Some Considerations

The Executive Board of the Society, which will hold its next meeting on October 14th in New York, will have placed before it a number of perplexing problems.

First and foremost will be consideration of legislation to be introduced during the 1932 session of the law making bodies of this State.

The task of adequately, yet concisely defining engineering, is not an easy one. However, during the past few months much study has been given to this matter and it is hoped that something worthy of the efforts expended will be forthcoming. The Legislative Committee of the New York State Society and the joint committee, sponsored by the American Society of Civil Engineers, which has been at work on a uniform law, have reviewed every available definition and have sought to create something that will stand the tests of criticism and time.

The question of removing the discriminatory effects of the Multiple Dwelling Act must again be faced. The veto of Governor Roosevelt compels the engineering profession once more to assume the offensive. What form this will take remains to be determined. One thing is pretty generally agreed upon. The discrimination must be removed though it take ten years to accomplish it. If engineers are to be denied the right to file any plans or specifications they may make, then others must be prohibited from filing plans and specifications they do not make. The right of architects to practice engineering is not admitted and will be contested so long as they seek to usurp the prerogatives, or restrict the legitimate practices, of engineers.

The administrative phases of the existing law are also in need of revision. This is a matter which merits recommendations from the Board of Licensing and the State Department of Education. The Society has always welcomed the assistance of the Board as well as that of the Department, whose representatives, Dr. Horner and Mr. Heisler, will be consulted for advice.

Doubtless, legislation of concern to the profession will again be proposed by persons outside the profession. The Society and its Chapters throughout the State must be on the alert. Matters which promote the public welfare should be supported, but those which seek to deprive the profession, that has contributed more to the protection of life and property than any other, of rights justly earned should be opposed without hesitancy.

Already certain proposals for a joint gathering of Engineers and Architects have been suggested. If such a conference can produce results fair to both professions no one will oppose another attempt to reconcile these two sister callings.

The New York State Society is and always has been glad to confer and co-operate with professional groups in any effort to safeguard the public and it offers its facilities to that end. However, it is quixotic to expect that engineers will sacrifice rights that others tenaciously hold to. The Society believes that there is one premise upon which to build mutual understanding and respect between any two, or amongst any greater number of, professions. This has been ably set forth by the New York State Board of Licensing for Engineers in its proposal of 1930, which has been endorsed by all engineering groups. It has also been splendidly stated by a prominent architect, Mr. Chas. Butler, in his address to the 1931 graduating class of Rensselaer Polytechnic Institute which address appeared in the August issue of THE AMERICAN ENGINEER.

Let each profession determine its own province and frame its own legislation, incorporating in the law whatever may be necessary to amply protect the other profession and the public. This Society has never proposed any measure that was not intended to promote the common good. It has sought to impress engineers with concern for public welfare.

One beneficial result, of an otherwise unfortun-

(Continued on Page 4)

DR. JAMES SULLIVAN DIES

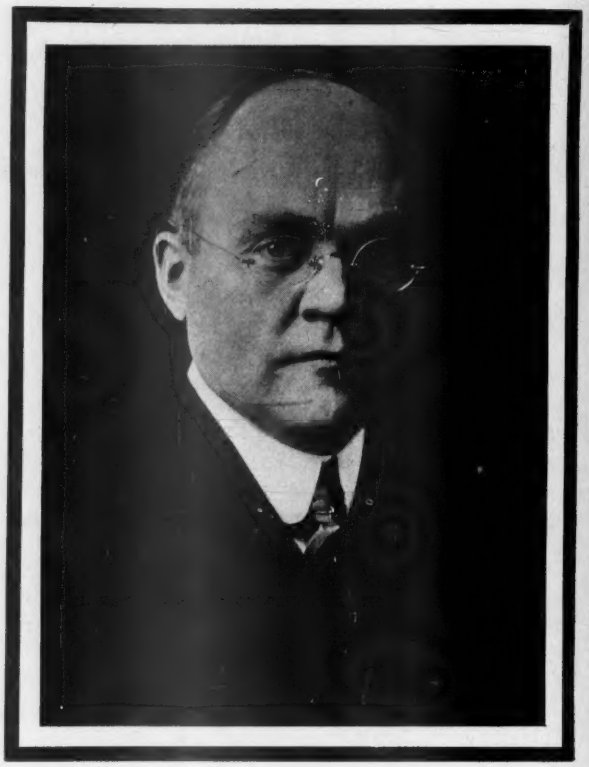
Long a Friend of the Society

The death of Dr. Jas. Sullivan, former Assistant Commissioner in Charge of Higher and Professional Education, which occurred on October 8th, was a distinct loss to the cause of Education in this State. His end, which came as the direct result of a stroke, followed a long period of illness that caused his retirement from office in May of 1931.

Dr. Sullivan had a distinguished career as a student, teacher, research worker, lecturer, author and administrator. He studied at Paris, Berlin, Rome, Vienna, Oxford and Munich in addition to Harvard which was his original Alma Mater.

He was a member of the Harvard and Century Clubs, the American Historical Society and the American Political Science Association. Amongst his writings may be noted a History of England and The Government of New York State.

The engineering profession, and particularly the New York State Society of Professional Engineers, is deeply indebted to the efforts of Dr. Sullivan. His counsel and his assistance were largely responsible for the success of the Chapter movement. The Society records its loss and extends to his family a heartfelt expression of sympathy.



DR. JAMES SULLIVAN

LEGISLATION FOR 1932

(Continued from Page 3)

ate controversy, has been the arousing of the interest of engineers to a consideration of the humanities of life. The gradual awakening of a professional spirit is promoting considerably more than the interests of engineering and of engineers. It is creating a consciousness of the fact that every engineer is first of all a citizen and that modern mechanical civilization, resulting from the efforts of scientists and engineers, will founder unless its creators interest themselves in its maintenance.

Legislation concerning engineering, which is today identified with almost every human endeavor, should receive the study and attention of all engineers. The Society invites cooperation.

It is to be earnestly hoped that the profession in this state will be a unit in the matter of a single profession. Only on such a basis can it exercise a real influence in a society composed of recognized elements. At this writing only a few isolated voices can be mustered in favor of separation or division of the profession. The stand taken by the National Council of State Board of Engineering Examiners should be weighed by those persons. One can only hope that the advocates of separation will not seek to resurrect an issue already decided by so many groups. The stand taken by the Engineering News-Record is unfortunately causing much complaint from engineers throughout the State. In many instances it has been misunderstood even by engineers who have read into the articles that which they do not intend to convey. It has already been seized upon by others and will doubtless be used as ammunition. To those who have complained to this publication the only answer possible is, that the privilege of personal opinion must be admitted and one hopes that this appreciation is reciprocated.

ENGINEERING SERVICES BY BIDDING

A Bad Practice Condemned

The October number of the American City has just come to hand. This interesting and splendidly edited publication is well worth the attention of engineers.

The latest issue contains the following article, which is herewith reproduced through the courtesy of the publishers:

BIDS FOR ENGINEERING SERVICES

A Reflection Upon Officials?— or Upon Engineers

When a municipality needs the services of an engineer as consultant on a water supply, sewage disposal plant, bridge, power plant or city plan, just how should it go about securing the engineer who is properly equipped by education and experience to handle the prospective work?

An unfortunate habit or method has come into existence in the last few years in asking bids for such engineering services. The most notorious case is that of San Diego, Calif., where, on November 17, 1930, the Common Council of the city of San Diego authorized the Superintendent of the Purchasing Department to advertise for bids for the services of a sanitary engineer in preparing plans and estimates of costs for the collection of sewage and the location of sites for its treatment. Protests were lodged by the San Diego, Los Angeles and San Francisco Sections of the American Society of Civil Engineers, but, notwithstanding these protests, the Council announced that it would receive bids on December 22. Only one bid was offered, however, and that by a former member of the San Diego Council, who is not an engineer. This bid specified that the contractor would employ a consulting sanitary engineer.

Upon whom rests the responsibility for the asking of bids for engineering services? Both officials and engineers have abetted this lamentable practice. City officials, reared with the idea that all materials should be bought from the merchant making the lowest bid, have carried the same idea into the purchase of engineering services, as though the efficient service of brains, education and experience could possibly be secured in low-bid competition. It is noteworthy that no instance is on record where city attorneys have suggested this method of securing competent engineering services. The attorneys are of a profession comparable to the engineering profession and realize that no adequate legal or engineering services could be secured via the low-bid route.

Unprincipled engineers who would have little chance to secure work if their ability and organizations were compared with those of competent engineers have not infrequently suggested to city officials that the officials ask for bids for certain engineering work, knowing well that engineers of standing would not wish to secure engagements in this manner; thus the incompetent engineer is able to secure the work and apparently save money for the city. But it is usually the case that either the work is unnecessarily extended in time so that the engineer's per diem fee mounts high, or the costs become excessive through lack of engineering knowledge—and in either case the city is the loser.

Proper Procedure in Securing Engineering Services

In order to secure satisfactory engineering service, just how should a city proceed? It is felt that most city officials who have been led into asking for bids for the services of consulting engineers in municipal work have done this through ignorance of the proper method of approaching the employment of a consultant and not through any desire to make a saving in the cost of such services or to prevent the city from securing the best possible engineering advice. To assist city officials The American City has prepared the following suggested procedure which has the approval of leading engineering societies, of progressive municipal officials who have seen the losses which cities have incurred in not employing competent consultants, and of a group of eminent consulting engineers:

1. A city wishing to secure a consultant for a specific piece of work should make inquiries of disinterested and qualified persons for the names of consulting engineers whose education and experience qualify them for the work contemplated. These inquiries should be addressed to the editors of national technical journals, to the professional bureau maintained by the national engineering societies with headquarters in New York City, and to officials in other cities where similar work has been completed.

2. Upon securing the names of a few qualified consulting engineers, the city officials should interview the engineers, look over their offices to determine the character of their organizations, and, through discussions with them, determine each engineer's personal qualifications for the work.

3. The officials should secure a record of the education and experience of each engineer, with references.

4. The officials should satisfy themselves by letter, inquiry and by visits to some of the engineers' work, as to the truth and quality of the records furnished by the engineers.

5. Finally, an agreement should be made with an engineer for the required service at reasonable

terms. Reference should be made to the pamphlet, "Charges for Engineering Services," published by the American Society of Civil Engineers, 33 West 39th Street, New York, which discusses in detail, for the benefit of clients, reasonable fees for various types of engineering services.

As a precaution, may we call particularly to the attention of both municipal officials and city engineers the need of a very specific statement of the type of work to be done for the fee. We mention this because there are engineers who will state rather sketchily that for a certain fee a report will be made.

Let us use as an example an investigation of a privately owned power plant which furnishes electricity to the city and which the city is considering purchasing. One engineer may state that for a certain sum he will make a report on the purchase of the plant, but his letter may fail to state just exactly what the city may expect for this sum, which may be rather low. Another engineering organization will state that the power plant will be examined in detail and appraised, and a fair figure set for its purchase; that, based on this purchase price, the organization will set up a schedule of rates for the sale of electricity which will make the plant self-sustaining. A definite sum is stated for this service. Following this, the engineer will state that, in addition, he will make a schedule of obsolescence for equipment in the plant, showing over a period of years the amount of the sinking-fund necessary and the cost of extending the distribution lines as may be necessary. This and such other services as he may outline he will designate as being available to the city at certain definite additional costs. The city is then in a position to decide just what services it desires at the present time, and can make a suitable arrangement with the engineer, knowing exactly what it will be called upon to pay.

Cutting Fees For Reports

An interesting example of what may be termed "price cutting" by engineers follows. A certain eastern city asked several prominent engineers what they would charge for a report on a new water-works project. The request was not in the nature of securing competitive bids, but rather was a courtesy request, as practically each one of the engineers had, at one time or another, served the municipality on some sanitary engineering work. One conservative, thoroughgoing engineer gave very careful consideration to the amount of personal work required, the size of staff which would be necessary to make the surveys and prepare the report, and submitted a figure of $20,000. Another engineering firm, of equal reputation, submitted a figure of $12,000. It stands to reason that the two organizations could not furnish identical services with such a wide variation in the fee. It may have been that the second organization figured that if it were retained to make the report, it would also be retained to make the plans and supervise the construction of the work. In this case, a small percentage, perhaps only one-half of one per cent, added to the fee for design and superintendence of construction, would more than make up for the cut in its fee for the initial report. It is customary for a municipality to employ the same firm of consulting engineers for an investigation or report and for the completion of the work, particularly if the work is done immediately following the report. There are thousands of instances, however, when the work has been delayed for one reason or another where the first engineer has been paid and his services terminated and another consultant has been employed to prepare the plans and supervise construction. In such cases, the first engineer will necessarily lose considerable money if we may judge his fee by that of the conservative engineer who decided that it would cost him $8,000 more to prepare a thorough report.

Summary

The following resolutions which were unanimously approved at a meeting of the American Institute of Consulting Engineers very well summarize the intent of this editorial discussion. This report was submitted under the title, "Competitive Bids for Engineering Services," and was adopted by the Council of the Institute on June 4, 1930.

1. The selection of engineers through the medium of price competition places a premium upon the choice of that engineer who will generally secure the least resultant value from the expenditures to be made.

2. The services of the engineers are highly professional in that the employing client is dependent upon the good faith, knowledge and ability of the engineer himself to insure thorough and conscientious service.

3. In view of the highly professional nature of the engineer's services, the selection of an engineer by competitive price bids should be classed just as contrary to the best interests of the employing client as would be the selection of a physician or legal advisor on a similar basis.

4. It is frequently found that members of a Board or Commission charged with the duty of selecting an engineer for important work, while fully realizing that such selection should be based upon the ability, experience and reputation of the engineer, are often influenced by other members who confuse engineering services with contractors' bids, which results in a selection on a price basis contrary to the best interests of those who are providing large funds for construction investment.

5. The selection of an engineer because of a low price for the engineering service completely overlooks the important fact that experience and qualified engineering direction of the planning and execution of construction often save many times the entire cost of the engineering service and there-

(Continued on Page 8)

NATIONAL COUNCIL OF STATE BOARDS

Report on Annual Convention

The 12th Annual Convention of the National Council of State Boards of Engineering Examiners was held in Detroit, Michigan, on October 1st, 2nd and 3rd. Its attendance and its enthusiasm were in excess of those of any previous meeting of the Council.

Eighteen State Boards and five National Engineering societies, viz.: American Engineering Council; A. S. C. E.; A. I. E. E.; A. S. M. E. and A. A. E. were represented.

A detailed account of the deliberations of the council is not available at this writing. Some of the important decisions and activities were:

The next convention will be held in New York.

The officers chosen for the coming years are:

President—Dr. D. B. Steinman, New York.

Vice-President—N. T. Kinzly, Nashville, Tenn.

Secretary-Treasurer—T. Keith Legare, Columbus, S. C.

Mr. Legaré, the retiring president and the new secretary treasurer has served in various capacities since the inception of the council. He has been seven times chosen as secretary. This is indeed a compliment.

The council approved the proposal of retiring President Legaré to the effect that a National Bureau of Engineering Registration be established. The following committee was appointed to work out the details of organization: H. A. Kelly, of Jersey City, N. J.; H. D. Mendelhall, of Lakeland, Florida, and George E. Taylor, of Charleston, W. Va. National Engineering Societies will be invited to collaborate by accepting representation on a joint committee.

The Council decided to continue its efforts to produce a uniform Registration Law satisfactory to all concerned. President Steinman appointed T. Keith Legaré to represent the Council on the joint committee,—composed of representatives of National and State Societies,—now working, under the sponsorship of the American Society of Civil Engineers, on the matter of a Uniform Law.

The Committee on Accredited Engineering Schools was authorized to proceed with the investigation and classification of colleges.

The council adopted the report of the Committee on Examinations of which D. B. Steinman is chairman. (The report appears in part elsewhere in this issue.)

The Annual Banquet took place on the evening of October 1st in the Book-Cadillac Hotel, which served as headquarters for the convention. The principal speakers were Dr. D. B. Steinman, President of the New York State Society of Professional Engineers and Dr. W. E. Wickenden, President of the Case School of Applied Science, of Cleveland, Ohio.

The following resolution which was unanimously adopted is a source of gratification to all those who believe that engineering deserves a place amongst the recognized learned professions:

RESOLUTION ADOPTED BY THE NATIONAL COUNCIL OF STATE BOARDS OF ENGINEERING EXAMINERS AT ITS CONVENTION HELD IN DETROIT, OCTOBER 1-3, 1931

(Presented by D. B. Steinman—Passed unanimously.)

WHEREAS, The essential purpose of Engineering registration is to test and qualify candidates as Engineers; and

WHEREAS, Engineering is fundamentally a single profession, despite its development (in common with other established professions such as Law, Medicine, and Architecture) of branches and specialties; and

WHEREAS, All engineers, whatever specialties they may subsequently pursue, receive a common basic training in those applied sciences, engineering principles, and modes of analysis that constitute the essential charactertistics of engineering practice; and

WHEREAS, One of the most valuable services of the Profession to the public is that of administering undertakings and projects that inherently comprehend a large number of the branches and subdivision of Engineering; and

WHEREAS, The individual Engineer, qualified by registration, is second to none in professional honor and integrity, and can be trusted as highly as the members of any other Profession not to undertake specialized work beyond his limitations; and

WHEREAS, The Engineering Profession needs its united energy to establish, improve, and strengthen the registration laws and their enforcement, and both the public and the Profession would suffer if forces of disruption were permitted to confuse and obstruct this essential program;

THEREFORE, BE IT RESOLVED:

1. That we reaffirm the essential unity of the Engineering Profession;

2. That we are opposed to any legislation tending to break down the solidarity of the Engineering Profession.

The New York State Society takes pride in the recognition that has been accorded to its able, unselfish and tireless leader. The profession contains no bigger man. The nation could use such talent. Congratulations, Dr. Steinman.

A WAY OUT?

Can Ethics Provide a Meeting of Minds?

The incorporation, in license laws and registration acts, of a provision whereby persons who violate a legally established code of ethics may be disciplined or eliminated from practice, suggests a means of reconciling differences of opinion as to the provinces of overlapping professions.

Architects and engineers might well give joint consideration to legislation, whereby existing laws could be amended in such manner as to provide in both cases for the establishment, by the respective Boards of Registration and Licensing, of a code of Ethics, the violation of which would be cause for the revocation of registration or license.

One of the controversial points between the two professions has been the contention of architects that engineering practitioners might undertake commissions beyond their capabilities. While engineers, pointing to the past for refutation of this argument, have refrained from expressing similar concern regarding members of any other profession such a position is naturally conducive to a counter offensive along similar lines.

The New York State Society has sought to promote friendly relations between engineering and the other recognized professions of this State. With but one exception it has been successful. In various instances throughout the State county chapters have fraternized with county groups from other professions. The demonstration and lecture sponsored by the Westchester County Medical Association and the Westchester County Chapter of this Society, described elsewhere in this issue, is an example of what might be a frequent occasion wherein architects and engineers were collaborating. With so much in common closer association would undoubtedly lead to a better understanding.

In every calling there are and always have been a few persons whose moral standards and ethical conceptions are at variance with those generally recognized by the great majority of practitioners. The present Engineers' Law provides for the revocation of licenses of those whose practices indicate negligence, incompentency or misconduct. In this manner disreputable or unqualified persons can, to a considerable extent, be removed from the ranks of the profession. The Architects' Law makes no such provision and there is no way of eliminating an architect guilty of willful neglect or incompetence, provided he practiced no deceit or fraud in obtaining registration.

Aside, however, from flagrant examples of incompetency and neglect, there are practices that should not be tolerated by any profession; such as willful misrepresentation, falsification, appropriation of the work of others, personal experimentation at the expense of another, exploitation of persons or communities or of their properties, together with various other activities injurious to the welfare of both public and profession. Such practices, however, are difficult to eliminate except through the instrumentality of the profession itself. To accomplish this the latter must be empowered to treat questionable conduct as sufficient grounds for disbarment or discipline.

In Canadian provinces and in one or two states of this country the laws regulating the practice of engineering authorize the Licensing Board to formulate and adopt a code of Ethics which must be subscribed to by every licensed engineer. Any violation of this code is considered cause for revocation of license. Such legal provisions unquestionably raise the character standards of the practitioners subject thereto.

With precedents already in existence it is but reasonable to believe that the license laws and registration acts of the State of New York could provide for setting up machinery that would establish a legally recognized code of Ethics, the violators of which could be removed from the ranks of the profession.

Surely such provisions, incorporated in the law and entrusted for execution to professional representatives clothed with official authority, should be ample guarantee to the public and to the members of any other profession that no practitioner is likely to attempt practices which would subject him to the discipline of a Board legally empowered to deprive him of his right to remain a member of the profession.

Here, perhaps, is a thought that might be elaborated upon with a view to the re-establishment of friendly relations and mutual respect between two professions so closely associated in their spheres of activity and in their accomplishments.

ENGINEERING SERVICES BY BIDDING

(Continued from Page 6)

fore makes it rather certain that cheap engineering services will result in excessive total cost for the completed work.

Comment: The above article was written after the compilation by The American City of 400 expressions of opinion and has been reviewed by a number of eminent engineers. It is in entire accord with the codes of this Society which has for several years been seeking, through its Chapters, to eliminate the practices, which, as pointed out, are detrimental to both public and profession.

EXAMINATIONS FOR REGISTRATION OF PROFESSIONAL ENGINEERS

Recommendations Adopted October 2nd, 1931

The report of the Committee on Examinations, appointed by the National Council of State Boards of Engineering Examiners, and headed by Dr. D. B. Steinman, which is herewith published in part, contains the most comprehensive analysis and the most impartial recommendations of any similar instrument that has as yet been promulgated.

While differing slightly from certain recommendations of the New York State Society and the New York License Board, the report is a masterly presentation and reconciliation of the views of the various State Boards. The ability and versatility of the chairman and the co-operation of the remaining members of the committee, as well as the response of those appealed to, indicate an unusual interest in this most important problem.

The length of the report precludes complete publication thereof in one issue. However the method, the findings and the recommendations are of such interest to all engineers that it has been deemed advisable to print the same in installments.

In so much as the report was approved at the Detroit Convention of the National Council of State Boards of Examiners the "Summary of Recommendations and the "Concluding Remarks" are reproduced here, as supplements to the first installment. They will again appear in their proper positions in a future issue.

EXAMINATIONS FOR REGISTRATION OF PROFESSIONAL ENGINEERS

Report of Committee on Examinations to the National Council of State Boards of Engineering Examiners – (1931)

INTRODUCTION

The Committee on Examinations was appointed at the 1930 Annual Meeting of the National Council of State Boards of Engineering Examiners, for the purpose of making studies toward the improvement and standardization of examination requirements and procedure for the registration of Professional Engineers.

As a basis for its studies and recommendations, the Committee prepared a questionnaire designed to ascertain present prevailing practice and opinion among the various State Boards of engineering examiners. This questionnaire was sent to the individual members of the State Boards. Thirty-two replies were received from eighteen States.

The returns yielded a valuable cross-section of present practice and opinion, throughout the country, regarding system and scope of examinations for registering Engineers. An analysis of the replies is presented under the following headings.

System of Examinations

WRITTEN EXAMINATIONS

All of the returns (covering 18 States) reported affirmatively, without exception, that their Boards hold written examinations for the registration of Professional Engineers.

On the question of personal opinion: "Do you favor written examinations for registration of Professional Engineers?" the replies were practically unanimous in the affirmative (31 Yes, 1 No).

Accordingly, the Committee recommends that written examinations be maintained as a *standard* requirement for the registration of Professional Engineers, with exemptions only in exceptional cases of obvious, outstanding educational and professional qualification.

Exemption of Engineering Graduates

According to the returns from 18 States, 6 of the States now exempt engineering graduates from the written examinations, and 12 of the States do not.

To the question "Do you favor exempting engineering graduates from the written examinations?" the responses from the 32 Board members were preponderantly in the negative (7 Yes, 23 No, 2 Qualified.)

In New York State, the licensing law now provides that the present exemption of approved engineering graduates from the written examinations shall terminate in 1937.

To comply with prevailing practice and opinion, the Committee recommends that all States work toward the goal of making written examinations a universal requirement for the registration of Professional Engineers, reducing any existing exemptions to a minimum as rapidly as may be expedient.

Uniform or Differentiated Examinations

The engineering profession is now under attack from outside forces seeking to advertise its heterogeneity and working against its solidarity. Unfortunately the recent trend in engineering education, departing from the original ideal of broad training in basic engineering fundamentals and developing into an emphasis of divergent specialties, furnishes the opposition with ammunition for the attack. Under these circumstances, it becomes increasingly important for the engineering profession to maintain and proclaim its essential one-ness. The emphasis now frequently placed on the diversification of engineering training and degrees should be redirected to the preponderant common basic

content of the engineers' educational and professional equipment.

An analysis of the curricula of leading engineering schools shows that approximately three-quarters of the training is common to all engineering students, and that only about one-fourth of the training is specialized to correspond to the diversification of degrees. In an engineering school worthy of the name, the curriculum for the C. E. degree includes a liberal content of essential fundamental courses in mechanical and electrical engineering, and the M. E. and E. E. students are required to take essential fundamental courses in the civil engineering and other departments. Moreover, all of the engineering students are required to take the complete basic courses in mathematics and the physical sciences. Accordingly the specific degree denotes additional specialization and should not be interpreted as a limitation of qualification.

These considerations lend especial interest and importance to the question of uniform versus differentiated examinations for registering Professional Engineers.

The questionnaire yielded the information that, of the 18 States represented in the returns, only 3 States hold uniform examinations for all applicants, 6 States give different examinations for different branches of engineering, and 9 States give examinations that are in part uniform and in part differentiated.

To determine proponderance of opinion and judgment, each examiner was asked which of the three procedures he personally favored. One voted for uniform examinations, 8 favored different examinations for different branches of engineering, 19 preferred examinations in part uniform and in part differentiated, and 4 recorded no opinion on this question.

The returns thus show a preponderance of both practice and opinion in favor of examinations in part uniform and in part differentiated.

Accordingly the Committee recommends that the *major* part of the written examination for Professional Engineers should be *uniform* for all applicants, and that a supplementary part of the examination may be differentiated for the different major branches of engineering (Civil, Mechanical, Electrical, Mining, and Chemical).

The Committee suggests that the uniform part constitute about three-fourths of the entire examination, and that the differentiated part be limited to one-fourth of the complete examination.. This suggested ratio is based on the actual ratio in the best engineering curricula, and is also in conformity with the standard already established in New York State.

The practice, in one or two States, of giving differentiated examinations in the further subdivisions of the major branches of engineering is to be deplored. Physicians and lawyers are qualified on the basis of examinations testing their knowledge of their broad professional field, not on their knowledge of a single specialty. Through registration laws and examinations, we should work for the integration, not the disintegration, of our profession. We go far enough when we admit, through one-fourth of the examination, that our profession is divided by partial difference in training into five recognized major branches.

Length of Examinations

Under the question "How many days do your Board's written examinations take?" the 18 States reported as follows:

7 States — 1 day
4 States — 2 days
2 States — 2½ days
4 States — 3 days
1 State — 4 days

The range is from 1 to 4 days, and the average time for the examinations is 2 days. A 2-day examination may therefore be regarded as the norm of present practice.

Individual judgment on this point was elicited by the question: "How many days, in your opinion, should adequate written examinations for Professional Engineers take?" Of the 32 Board members who responded, 12 favor 1 day, 9 favor 2 days, 9 favor 3 days, and 2 favor 4 days for the examinations; the average is a fraction over 2 days. Five Board members favored lengthening their present respective examinations, and only two examiners suggested a reduction.

In order to conform with present prevailing preponderance of practice and preference, the Committee recommends that *two days* be made the standard period for the written examinations for Professional Engineers. In accordance with the principle previously developed, 1½ days should be devoted to the basic examinations uniform for all candidates and ½ day should be devoted to the more specialized examination in which the candidate takes his option of questions in civil, mechanical, electrical, mining, or chemical engineering.

Oral Examinations

The questionnaire revealed that, of the 18 States responding, 11 States hold oral technical examinations to supplement the written examinations, and 7 States do not.

To the question of individual preference, "Do you favor oral technical examinations to supplement the written examinations?" 21 Board members replied Yes, 10 replied No, and 1 gave no opinion.

It thus appears that the preponderance of present practice and opinion favors oral technical examinations as a supplement to the written examinations. The explanatory comments on the questionnaires show that the oral examinations are not generally given to all candidates, but only in special cases determined by the judgment of the Board.

(Continued on Page 16)

THE ENGINEER AND HIS LEGAL RESPONSIBILITY

Comments by an L. L. B. (Bronx Chapter)

The Engineer, in common with the Doctor and the Lawyer, has a certain responsibility to his client. Naturally it often occurs that disputes arise between them. The causes of these disputes are too varied and too numerous to include in one article. A few of the more common cases of disagreement, that have arisen, are noted herewith.

The New York Court of Appeals has defined the legal liability of a professional man in these words, "The practitioner must possess at least the average degree of learning and skill in his profession prevailing in the part of the country in which his services are offered to the public and, if he exercises that learning and skill with reasonable care and fidelity, he discharges his legal duty."

The same court has held that absolute accuracy is not required. Small errors which occur when average skill and diligence have been used are excusable.

In an outstanding case in New York, one that could well apply to an Engineer, an Architect prepared plans for a dwelling and supervised the construction thereof. When the building was completed it was discovered that a bay window was 2¾ inches higher, from the floor, than the plans called for. In dismissing a suit against the Architect the Court in its opinion stated, "The Plaintiff (The Architect) came from day to day to superintend the work and while thus superintending was he bound to have ascertained that the window sills in the front parlor were 2¾ inches higher from the floor than was authorized by the plans? To an inexperienced eye the difference would not have been perceptible but should the knowledge and skill of a good Architect at once have detected it? The testimony is not satisfactory to establish the affirmative of the proposition."

If the plans and specifications furnished by an Engineer are not strictly followed the Engineer is relieved of all responsibility. The following is a case in point. The plaintiff claimed damages because of the collapse of an arch designed by the defendant, an Engineer. At the trial it was proved that stone skew backs, called for in the plans, had been omitted. There was doubt as to whether or not this had caused the failure, but the court said, "There is no principle upon which a case of this kind can be excepted from the rule, so firmly established, that every stipulation which the parties have inserted in a contract by way of conditions to be performed is to be deemed material."

An Engineer is hired primarily because of his individual skill and ability and because his client reposes faith in him. He cannot therefore delegate any duty which requires the exercise of his own knowledge and discretion. When the nature of the work is such that he is compelled to rely on the work of others he must assume the entire responsibility. He should select his assistants with great care. When those he hires are working under his supervision, to use a legal phrase, they are working within the scope of their authority. They are legally agents of the Engineer and are responsible to him. He in turn is responsible to his client for them.

However, because of the heavy burden this doctrine would impose where it becomes physically impossible for an Engineer to supervise details, the Courts have, of late, shown a tendence to relax the rule. In a case in Massachusetts an Engineer gave a certificate stating the amount of fill necessary on a certain job. The computation on which the certificate was based was made from field notes taken by an assistant. These notes were incorrect. Because of the error the client suffered a pecuniary loss. He sued the Engineer for the damages occasioned by the incorrect certificate. The Court refused to hold the Engineer liable and stated its reasons in these words, "It is too narrow an interpretation to insist that they (the field notes) shall be made by the Engineer in person, or in his actual presence. If made in the usual manner, by his assistants, according to his directions, and if then certified by him to be correct, the Jury may properly find that there has been a substantial performance by the Engineer of the duty which by the fair construction of the contract the parties intended."

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CHAPTER AND RELATED NEWS

ACTIVITIES OF THE WESTCHESTER AND BRONX COUNTY CHAPTERS

The Westchester County Chapter, The Westchester County Recreation Commission and The Westchester County Medical Association jointly sponsored a Lecture-Demonstration by Mr. Sergius P. Grace, Assistant Vice-President of the Bell Telephone Laboratories, Inc. This lecture- demonstration was a dramatic presentation and description, by one of the outstanding figures in the field of popular science discussion and demonstration, of some remarkable discoveries and developments which have been recently made in the Bell Telephone Laboratories.

The meeting was held on the evening of October 14th at the Westchester County Center in White Plains, the Westchester County Seat. It had been thoughtfully planned, organized and advertised under the direction of the President of the Westchester County Chapter, Mr. Harold W. Watt. Civic, legal, medical, architectural, banking, real estate and merchants' associations cooperated with the sponsoring organizations in promoting the undertaking and the interest manifested was so general that the seating capacity (4800) of the huge auditorium of the County Center was severely taxed.

The Bronx County Chapter, The Bronx Board of Trade, The Bronx Rotary Club and The Bronx Real Estate Board will cooperatively act as hosts to the New York State Waterways Association at its twenty-second Annual Convention which will be held at the Concourse Plaza Hotel, The Bronx, on October 26th and 27th.

The New York State Waterways Association was organized 23 years ago. Its membership is composed of men prominent in public and private affairs in all parts of New York State. It has played an important role in the development of the waterways of the State for commercial use and communication by formulating policies and initiating legislation for waterway improvements and in assisting State governments by considering and advising regarding waterway projects. The holding of this convention in The Bronx will not only be of particular interest to the people of that county by affording an opportunity for discussion of the need of the development of intra-county waterways but will also be of interest to the people of the entire city and its environs because of the influence which this association is capable of exerting upon the urgently needed improvement of the 60 miles of undeveloped waterfront within the New York Port district.

The program of the convention is being prepared by a Committee of Arrangements composed of four (4) delegates from each of the participating host organizations. The chairman of the committee is the President of the Bronx County Chapter, Prof. Alexander Haring, to whose initiative the credit of the undertaking is due.

Some of the planned activities of the convention are: Addresses of welcome to the delegates by Hon. Henry Bruckner, President of the Borough of The Bronx, and Prof. Alexander Haring, President of the Bronx County Chapter, which will be responded to by Judge William G. Woolard of Albany and Mr. John P. Magill, Vice-President of the Maritime Association of New York; the reading of papers relative to waterways by Federal and State officials, army officers, bankers and editors and one by Joseph F. Lamb, Vice-President and spokesman of the Bronx County Chapter; a boat trip around The Bronx for the inspection of its surrounding waters and inland streams; a luncheon with the Bronx Rotary Club; a dinner to which notable guests will be invited; an automobile trip through the Bronx Parks and Zoological Gardens and over the famous parkways of Westchester County. The itinerary of the trip through Westchester County will be prepared through the courtesy of Mr. Leslie G. Holleran, Deputy Chief Engineer of the Westchester County Park Commission and Past President of the Westchester County Chapter who will also arrange for a motorcycle police escort to accompany the visiting delegation.

These two activities are of major importance. They are both notable for their cooperative features and for the magnitude of their scope. They are large-scale, well organized activities which, although related to the electrical and civil branches of engineering, are designed and executed, by cooperating engineering and non-engineering groups, in such a way that the public interest and support will be aroused and secured. These undertakings are happy illustrations of activities conceived and developed outside of narrow technical bounds which will advance the profession in the public esteem by demonstrating that engineers can be active, interested and interesting members of the social organism.

AN ACTIVITY OF THE MONROE COUNTY CHAPTER

A report has been received from Mr. Charles W. Marvin, President of the Monroe County Chapter, that an endeavor was launched at a meeting of that Chapter held on September 21st at the

(Continued on Page 13)

A GREAT ACHIEVEMENT

Hudson River Bridge Opening, October 24th

On Saturday, October 24th, 1931, at 2:00 o'clock in the afternoon, formal ceremonies, in which Governor Franklin D. Roosevelt of New York and Governor Morgan J. Larson of New Jersey, are to participate, will mark the practical consummation of one of the greatest of human undertakings.

The George Washington Bridge, connecting Washington Heights in New York with Fort Lee in New Jersey, is unquestionably the most stupendous bridge engineering feat that has ever been accomplished. It may not long retain its supremacy as the world's greatest span, but it will always remain a significant milestone in the art of bridge building. Many great structures of similar character have preceded it, but when one stops to realize that its span is practically twice as great as anything heretofore attempted, the skill and, above all, the courage of the great Engineer and the staff that made it possible, are something that command the admiration of mankind.

True, many forces, elements and agencies, such as legal, financial and governmental, played an important role in creating this great structure; but in the final analysis they would be entirely impotent without the knowledge of the engineer. Nature supplies the laws, the forces and the materials and to the engineer has been assigned the sublime role of knowing and applying what nature has so abundantly provided.

In this moment of gratification and pride in man's accomplishments it is perhaps not amiss to remind ourselves that nothing from nothing arises, so far as human reason will allow, and that back of all there must be an Omniscience and an Omnipotence. Let us not forget that whatever mankind accomplishes, the same is never contrary to the designs of a "Divinity that shapes our ends."

The civic organizations of upper Manhattan and The Bronx, together with the Bronx Chapter of the New York State Society of Professional Engineers will participate in the ceremonies. Professor Al. Haring, President of the Bronx Chapter, together with Raphael J. Smyth, Past President of the Chapter, and Arthur V. Sheridan, are representatives who will assist at the formal opening which will precede by one day the actual opening of the bridge. An organization known as the Interstate Hudson River Bridge Association, of which Conrad Scheider is President, John M. Haffen, Vice-President, and Charles E. Reid, Executive Secretary, is in charge of the ceremonies. To this group of men should be given an expression of appreciation. In common with similar groups in New Jersey, they persistently and consistently petitioned the governments of the two States, together with the Port Authority to rear the great structure. And, finally, it was none other than Othmar H. Amman, the Engineer, who pleaded before and convinced the civic groups.

Too bad the bridge could not have been named after so capable and so courageous a man.

CHAPTER AND RELATED NEWS

(Continued from Page 12)

Rochester Chamber of Commerce to frame a schedule of minimum charges for engineering services in Monroe County. The value of such schedules is generally recognized. Their adoption by responsible members of the community and the profession in different counties would establish proper basic fees for engineering services performed in conformity with approved practice; would tend to create public confidence in the reasonableness of such fees; and would secure adequate returns for services competently performed. They would also tend to elevate the standards of service generally as commissions would naturally gravitate more strongly toward those who are most vigilant in protecting the interests of their clients. Regard for both public and professional welfare should prompt the Chapters throughout the State to expeditiously create such schedules.

A CONTRIBUTION FROM THE ALBANY SOCIETY OF ENGINEERS

On September 25th there was received from the Albany Society of Engineers a contribution of twenty-five dollars ($25.00) to the legislative fund of the New York State Society. This registers the approval of another independent engineering organization of our past legislative endeavors and gives pecuniary encouragement to their continuance. Acknowledgment is made of our appreciation of the monetary and moral support of the Albany Society of Engineers.

The work of creating an adequate legislative fund from which to defray the expenses of the coming legislative campaign is not a new activity. It is recommended again to the attention of those Chapters whose names are not yet inscribed on the roster of contributors.

RAPHAEL J. SMYTH
Chairman, Chapter Activities.

NEWS ITEMS

AMERICAN ASSOCIATION OF ENGINEERS

The annual convention of the American Association of Engineers took place on September 28th, 29th and 30th in Huntington, West Virginia. Representatives of every part of the country were in attendance.

The convention decided to consider a program for fostering State Societies throughout the country. A special nationwide committee was formed for the purpose and Arthur V. Sheridan, Past President of the New York State Society of Professional Engineers, has been requested to act as chairman of this national committee.

Amongst the reports presented was a most interesting and instructive brief on Engineering Education by Dr. J. L. Waddell.

Considerable interest was manifested over the selection of next year's meeting place. Sacramento, California, and Washington, D. C., both sought the convention. The matter was referred to the Board of Directors.

The following officers were elected to serve during the coming year:

President, Erle K. Ramsey of Oklahoma City, Oklahoma.

Vice-President, Vic Householder of Phoenix, Arizona.

Director-at-Large, Donal L. Chamberlain of Washington, D. C.

St. Paul Meeting

The fall meeting of the Society, held in St. Paul, Minnesota, during the week of October 5th, was largely devoted to serious consideration of the economic exigency which confronts the American people.

Approval of President Hoover's nationwide program, for the organization of local agencies to alleviate unemployment, was given by the Board of Direction which decided to urge engineers to assume their duties and obligations as citizens in their respective communities.

The Board of Directions authorized local sections to proceed at once with plans for the relief of unemployed engineers. (See comment.)

In view of the prevailing conditions the Board voted to dispense with the spring meeting of the Society, scheduled for Miami, Florida.

All present representatives of the Society on American Engineering Council were reappointed.

The nominating committee reported that its choice for President to serve during 1932 was Herbert S. Crocker of Denver.

Comment: The proposal for relief of engineers through the medium of local sections is commendable. No existing agency for assisting in such a program can be of more value than the New York State Society with its chapters.

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PERCY A. KOLESCH

Prominent Associate of Engineers

Percy A. Kolesch, President and Treasurer of Kolesch and Co., famous for a quarter of a century as manufacturers of surveying instruments and engineering accessories, died suddenly on Sunday evening, October 4th at Mammoth Rock, Kentucky.

PERCY A. KOLESCH

Mr. Kolesch was born in New York in 1883 and has been associated with engineers practically all of his very active career. He was an Associate Member of the Nassau-Suffolk County Civil Engineers Society; an Associate Member of the L. I. Society of Architects; a member of the Association of German-American Technologists; a director of the International Association of Blue Printers and Allied Industries; a member of the Blue Pencils Club of which he was secretary for 20 years; a life member of the Tucson Lodge, F. & A. M., and a charter member of the Great Neck Lodge, B. P. O. E.

Always interested in young men, especially engineers, his purse, his assistance and credit were always at the command of those who were seeking to establish themselves. THE AMERICAN ENGINEER acknowledges the loss of a valued friend.

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EXAMINATIONS FOR REGISTRATION

(Continued from Page 10)

The Committee therefore recommends that the State Boards make provision for oral examinations, not to replace but to supplement the written examinations. The oral examinations should be optional with the Board and should preferably be limited to special cases determined by the judgment of the Board. The use of oral technical examinations (as distinguished from personal interviews) should be progressively minimized.

Use of Reference Book

Of the 18 State Boards reporting on the questionnaire, 15 States allow the use of reference books in all or part of the written examinations and only 3 States do not.

Under the question "Do you favor allowing the use of reference books in the written examinations?" 26 Board members replied Yes and 6 replied No. Those voting in the affirmative generally indicated that they favored allowing reference books for only part of the examinations.

To conform with the prevailing practice and preference, the Committee recommends that a part of the written examinations be planned to permit the use of reference books. One practical suggestion is that the first day's examinations (uniform for all candidates) be without reference books, and that the second day's examinations (uniform in the forenoon and differentiated or specialized in the afternoon) be of such nature as to permit the use of reference books. This procedure may be varied. The use of a slide rule may properly be permitted for all parts of the examinations.

Submission of a Thesis

Of the 18 State Boards responding to the questionnaire, only 3 now require, as part of the written examination, the submission of a thesis upon some work on which the candidate has had charge in a responsible capacity.

The question "Do you favor requiring the submission of such thesis as part of the written examination?" brought 14 replies in the affirmative and 18 replies in the negative.

While recognizing certain merits in the requirement of a thesis to be submitted as part of the written examination, the Committee does not feel justified in recommending it at this time as a standard requirement. Instead the Committee suggests that the thesis requirement be left, for the present, optional with the individual State Boards, pending the development of more crystallized experience and opinion on this subject.

Classification of Engineers

Perhaps the most important question before the Profession today is whether registration of engineers should be as a single profession or on the basis of classification into branches or specialties.

Other professions, as law and medicine, also have their branches and sub-specialties in practice, but these other professions would not consent to have the differentiation fixed and delimited by registration laws. Engineering seems to be the only profession willing (in part) to surrender to segregation and delimitation of fields of professional activity by statute.

Since the question of classification or non-classification of licensees is important as a background for any proper study of systems of professional examination, the questionnaire included the query: "Does your Board issue certificates in professional engineering or in the various branches thereof?" The replies from 18 States yielded the following information:

Ten States (New York, Iowa, Pennsylvania, Indiana, North Carolina, Tennessee, Colorado, Wyoming, Arkansas, Idaho) issue certificates in Professional Engineering without classification.

Two States (Oregon, South Dakota,) issue certificates in Professional Engineering but *also* name the branch of engineering in which the holder is *especially* qualified to practice.

Four States (Arizona, Virginia, Michigan, Florida) issue certificates specifying the branch of engineering which the holder is authorized to practice.

Two States (California and Louisiana) issue certificates in Civil Engineering only.

The prevailing practice appears to be that of issuing certificates in Professional Engineering rather than in the separate branches thereof. In some of the States, differentiation of the branches of engineering has been an unwilling surrender to outside forces.

It may be significant to note that, although 4 States issue restrictive certificates in the various branches of engineering, three of those States hold examinations that are in part uniform for all applicants.

The Committee feels that any classification or differentiation in the certification of registered engineers is to be deplored as a step in the wrong direction, laying the foundation for future jurisdictional disputes and for disintegration of the profession. Registration should be on the basis of a single profession of Engineering. Just as every lawyer or physician is trusted by statute to practice in the broad field of his profession without restriction to a branch or specialty, so every Registered Professional Engineer should be trusted to practice in the broad field of Engineering without statutory delimitation. The individual Engineer, knowing his own limitations and second to none in professional honor and integrity, can be trusted not to overstep the bounds.

The examinations for registration, as well as the accompanying investigation of professional record and character, should be designed to satisfy the Board that the candidate can safely be entrusted to practice as a professional engineer without other

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limitation than his own conscience and the opinion of his fellow-engineers may prescribe.

Accordingly, the written examinations should, so far as practicable, be uniform for all candidates, covering the broad fundamental training common to all branches of engineering. The differentiated part of the examination, in which the applicant is given the opportunity to show his additional more specialized training, should be reduced to a minimum.

The desired picture of a Professional Engineer, to be brought out by this plan of examination, is a man of high intellectual honesty, thoroughly trained in the common basic fundamentals underlying all engineering work, with some essential knowledge of the elements of all branches of engineering, and with additional specialized knowledge and training in one major branch of engineering. The better engineering schools have curricula designed to meet this specification. The State Boards should design their examinations to test the fulfillment of this specification. If this were universally done, every registered Professional Engineer could be certified as fully worthy of the complete trust implied, and the pressure to segregate and delimit engineering practice would be nullified.

Scope of Examinations

In order to secure a cross-section of present practice and opinion in respect to scope of examination for registering Professional Engineers, check lists of subjects and topics were submitted with the questionnaires sent to Board members, and the latter were requested to indicate the subjects now included in their examinations as well as their individual recommendations thereon. Two groups of subjects were submitted, one for the uniform part of the examination and the other for the differentiated (specialized) part. The responses relative to the subjects suggested for the uniform part will first be presented and analyzed, (in a future issue).

Summary of Recommendations

Based on the foregoing comparative study of present practice and prevailing preference in the matter of examinations for Professional Engineers, the Committee submits the following recommendations toward standardizing the examination requirements and procedure.

1.—Written examinations should be maintained as a *standard requirement* for the registration of Professional Engineers, with exemptions only in exceptional cases of obvious outstanding educational and professional qualifications.

2.—Exemption of engineering graduates from the written examinations is not favored.

3.—The major part of the written examinations (about three-fourths) should be uniform for all applicants, and the remaining minor part may be differentiated for the different major branches of engineering (Civil, Mechanical, Electrical, Mining and Chemical.)

4.—Any further subdivision of these major

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branches of engineering into further specialties should not be recognized by differentiated examinations.

5.—The written examinations for registering Professional Engineers should be scheduled to take at least *two days,* preferably three days.

6.—Oral interviews may be provided, at the option of the Board, to supplement the written examinations in special cases, but the use of any oral technical examinations should be progressively minimized.

7.—The major part, at least, of the written examinations should be planned to permit the use of reference books. The use of a slide rule may be permitted in all parts of the examinations.

8.—The requirement of a thesis to be submitted as part of the written examination is recommended as a desirable feature but may, for the present, be left optional with the individual State Boards.

9.—Certification of successful candidates should be as Professional Engineers (or preferably as Engineers) without classification or differentiation into branches or specialties. The examinations should be planned on this governing principle.

10.—The written examination, to meet present requirements and educational standards, should test: (a) basic knowledge of the *fundamental mathematical and physical principles* underlying all engineering work; (b) general knowledge of the *common essentials of all branches of engineering*; (c) *more thorough general knowledge of one major branch of engineering.*

11.—Each examination paper should contain from 10 to 15 questions, from which the candidate is to select 10.

12.—The official time allowance should be 3 hours for each paper, but the questions should be so framed as to permit completion in a fraction of the allotted time.

13.—The questions should be simple and direct, and such as can easily be answered by an engineer who has been out of college for 10 years.

14.—The recommended schedule and scope of the written examinations is as summarized below. (To be published in future issue).

Concluding Remarks

A profession is judged by its qualification standards. Without written examinations to test educational qualifications, Engineering cannot take its rightful place among he learned professions.

To jusify the breadth of scope of practice claimed for our profession, the qualifying examinations must be broad in scope. The range of subjects included in the examination will be compared with the range of practice claimed by the profession.

To the extent that Engineering is essentially a mode of thought based on a mastery of the laws of Nature, the examinations should be basic and fundamental rather than specialized. To the extent that the greater part of engineering training is common to all engineers, without regard to branch or specialty, the greater part of the examination should be uniform for all candidates.

The essential purpose of the examination should be to test and qualify the candidate as an Engineer, not as a specialist.

Respectfully submitted,
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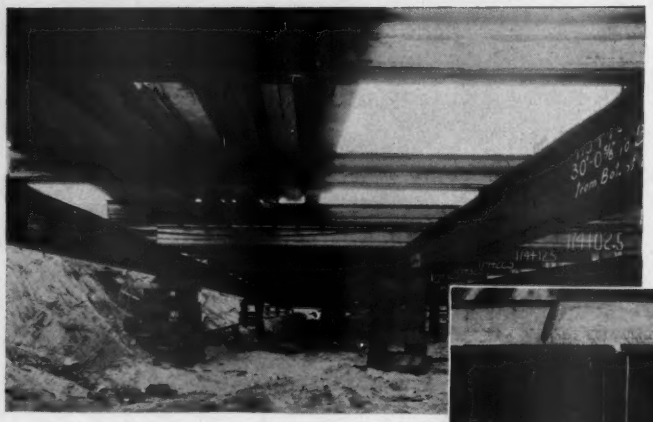

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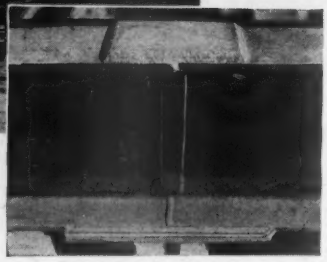

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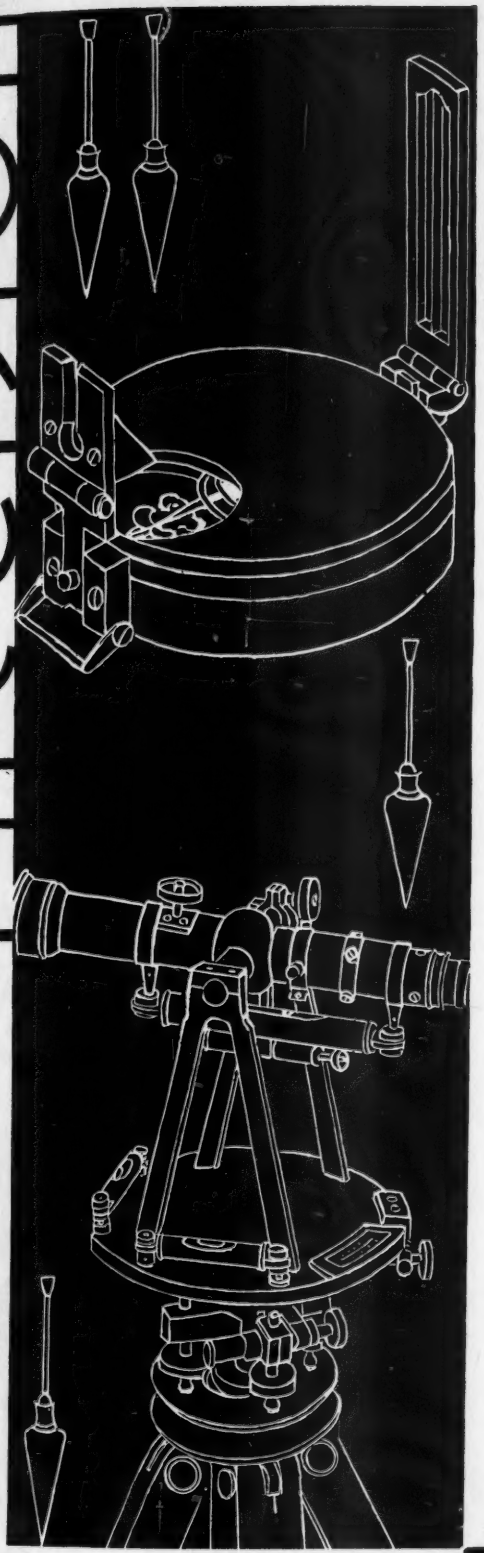

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